REMARKS

The Office Action dated October 19, 2007 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 8, and 9 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Claims 3, 4, 10 and 11 have been canceled without prejudice or disclaimer. Claims 1, 2, 5-9, and 12-17 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claims 1-5, 8-12, and 15-17 under 35 U.S.C. §103(a) as being unpatentable over Pehlke (U.S. Patent Pub. No. 2002/0136325) in view of Hareyama (U.S. Patent No. 6,700,440). The Office Action took the position that Pehlke discloses all of the elements of the claims, with the exception of powering on or off at least one branch of the power amplifier according to the received instruction to enable a logarithmic change in output power of the amplifier. The Office Action then cited Hareyama as allegedly curing this deficiency in Pehlke. This rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-7 are dependent, recites a method which includes receiving an instruction to adjust the output power of power amplifier, powering on or off at least one branch of the power amplifier according to the received instruction to enable

a logarithmic change in output power of the amplifier, and amplifying a signal according to the adjusted output power. The instruction specifies at least one of a percentage change in power and a dB change in power.

Claim 8 recites a system including means for receiving an instruction to adjust the output power of power amplifier, means for powering on or off at least one branch of the power amplifier according to the received instruction to enable a logarithmic change in output power, and means for amplifying a signal according to the adjusted output power. The instruction specifies at least one of a percentage change in power and a dB change in power.

Claim 9, upon which claims 10-14 are dependent, recites a system including a receiving engine capable of receiving an instruction to adjust the output power of power amplifier, and a determining engine, communicatively coupled to the receiving engine, capable of determining how many branches of a power amplifier to power on or off according to the received instruction to enable a logarithmic change in output power. The system also includes a power amplifier engine, communicatively coupled to the determining engine and the power amplifier, capable of transmitting the determination to the power amplifier. The instruction specifies at least one of a percentage change in power and a dB change in power.

Claim 15, upon which claims 16 and 17 are dependent, is directed to a power amplifier. The power amplifier includes a plurality of branches for controlling transistors, and a plurality of transistors, each transistor being communicatively coupled

to a branch of the plurality of branches. The transistors are arranged in a logarithmic scale, thereby enabling a logarithmic change in output power with the powering on or off of a transistor.

According to certain embodiments of the invention, therefore, a system and method are provided that enable power control capability in a linear power amplifier from a maximum output power to a minimum output power in linear steps of 2dBm there between. Accordingly, power amplifier output power can be adjusted linearly in dB according to power needs, thereby reducing overall power consumption.

As will be discussed below, the combination of Pehlke and Hareyama fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the advantages and features discussed above.

Pehlke discloses a branched power amplifier circuit that includes two or more amplifier segments or branches, each with a corresponding lossy modulator. The branched power amplifier may be dynamically resized by enabling different ones of its branches, to deliver peak efficiency at a number of different amplifier output power levels. Each amplifier branch operates in a saturated mode and selectively amplifies an RF input signal. The lossy modulators provide either supply voltage or supply current modulation to corresponding amplifier branches, thus imparting highly linear amplitude modulation to the overall output signal generated by branched power amplifier, despite its saturated mode operation.

Hareyama discloses a high-frequency power amplifier system including a plurality of individual amplifiers connected in parallel. The amplifiers include switching-driven FET's. A fixed drain voltage is applied to one amplifier and a variable drain voltage is applied to another amplifier through a section including a DC-DC converter that converts the voltage according to a control value of a control signal. The turning on and off of the operation of the power amplifier is controlled by a control signal. The circuit constants of a matching circuit are variable. In a high output power region, the power amplifier is turned on and, in a low output power region, turned off.

Applicants respectfully submit that the combination of Pehlke and Hareyama fails to disclose or suggest all of the elements of the present claims. For example, Pehlke and Hareyama do not disclose or suggest that the instruction to adjust the output power of power amplifier "specifies at least one of a percentage change in power and a dB change in power," as recited in claims 1, 8, and 9.

According to embodiments of the present invention, a power amplifier control system 285 controls the power amplifier 280 output power based on instructions received from a base station, other wireless node, or other source. For example, if a wireless device incorporating the transmitter section 200 is near a base station (e.g., BS 12), the base station can instruct the power amplifier control system 285 to decrease the output power on the power amplifier 280, thereby reducing power consumption and reducing interference in any other nearby wireless devices. The power amplifier control system 285 will then instruct the power amplifier 280 to turn off one or more branches to

decrease output power. However, if the wireless device incorporating the transmitter section 200 is far away from a base station, the base station can instruct the power amplifier control system 285 to increase the output power of the power amplifier 280 (Specification, paragraph 0028). The instruction from the control system may specify a percentage change in power and/or a dB change in power.

Neither Pehlke nor Hareyama discloses that the instruction to adjust the output power of power amplifier "specifies at least one of a percentage change in power and a dB change in power." Pehlke does not make any mention of receiving any type of instructions to adjust the output power. Pehlke merely discloses that the power amplifier 12 is configurable since different branches 14 may be enabled to effect different peak power efficiencies. The Office Action cited paragraphs 0007 and 0066 of Pehlke as allegedly disclosing that the instructions specifies a percentage change in power or a dB change in power (see Office Action, page 4). Applicants respectfully submit that these sections of Pehlke fail to disclose or suggest the instruction of the claimed invention.

Paragraph 007 of Pehlke merely disclose that "[t]he branched power amplifier may be configured so that the output power of individual branches, or selected combinations of the individual branches, is set at the point of peak operating efficiency for that branch or combination of branches. The output powers available from the branched power amplifier may be matched to the power control steps defined for one or more air interface standards. For example, IS-136 defines 4 dB steps in transmit signal power" (Pehlke, paragraph 0007). Paragraph 0066 only discloses that the invention of

Pehlke may be carried out in different ways, but does not specify anything regarding an instruction, percentage change in power, or dB change in power. In fact, as mentioned above, Pehlke does not even disclose receiving any type of instruction. Consequently, Pehlke cannot disclose or suggest that "the instruction specifies at least one of a percentage change in power and a dB change in power," as recited in claims 1, 8, and 9.

Hareyama fails to cure the deficiencies in Pehlke outlined above, as Hareyama also fails to disclose or suggest that the instruction to adjust the output power of power amplifier "specifies at least one of a percentage change in power and a dB change in power." Hareyama merely discloses that a PA_CONT signal is supplied from a controller to the RF power amplifier 1 such that the values detected by an output power detector 3 are an instructed value transmitted from a base station as a target value (Hareyama, Column 3, line 66 – Column 4, line 5). However, Hareyama does not disclose or suggest that the PA_CONT signal specifies a percentage change in power or a dB change in power. As such, Hareyama fails to cure the deficiencies in Pehlke.

Thus, for at least the reasons discussed above, Applicants respectfully submit that the combination of Pehlke and Hareyama does not disclose or suggest that the instruction to adjust the output power of power amplifier "specifies at least one of a percentage change in power and a dB change in power," as recited in claims 1, 8, and 9. Accordingly, Applicants respectfully request that the rejection of claims 1, 8, and 9 be withdrawn.

Claims 2, 5-7, and 12-14 are dependent upon claims 1 and 9, respectively. Therefore, claims 2, 5-7, and 12-14 should be allowed for at least their dependence upon claims 1 and 9, and for the specific limitations recited therein.

Furthermore, with respect to claim 15, Applicants respectfully submit that the combination of Pehlke and Hareyama fails to disclose or suggest "wherein the transistors are arranged in a logarithmic scale, thereby enabling a logarithmic change in output power with the powering on or off of a transistor," as recited in claim 15. As illustrated in Fig. 3B, which is a block diagram, the embodiments of the present invention provides the power amplifier 280 as part of the transmitter section 200 (FIG. 2). Each input (In) of the section 280a is communicatively coupled to a transistor of the transistors 280b, which vary in size to enable linear in dB steps in adjust output power levels of the amplifier 280 as shown in Table II of the present specification, where transistors are arranged in a logarithmic scale (See Specification, paragraph 0032).

Applicants respectfully submit that Pehlke and Hareyama fail to disclose or suggest that the transistors are arranged in a logarithmic scale. Pehlke merely discloses that the "lossy modulator 34 includes a control circuit 60, which typically comprises an operational amplifier 64, a current sense resistor 66, a control current source 68, and a signal resistor 70. The lossy modulator 34 further includes the pass transistor 52" (Pehlke, paragraph 0041).

Hareyama only discloses that "[w]hen there is designation of target value for the high output power region, a control signal CONT(2) for operating both the power

amplifiers PA(1) 1_1 and PA(2) 1_2 is transmitted from the controller. The switch SW20 is turned off and the switch SW21 is turned on by the control signal CONT(2) to change the power amplifier PA(1) 1_2 to the operation mode thereof. Then, the control signal CONT(2) turns off the switch SW11 so as to make the branch of the capacitor C13 and the inductor L11 turn to connected mode. Also, the control signal CONT(2) turns off the switch SW12 to cut off the branch of the capacitor C14. Thereby, the circuit constants of the matching circuit 2 are set to meet the matching condition in the case where both the power amplifiers PA(1) 1_1 and PA(2) 1_2 are operated" (Hareyama, Column 5, lines 29-67). Hareyama fails to disclose or suggest that the transistors or switches are arranged in a logarithmic scale. As such, Hareyama fails to cure this deficiency in Pehlke.

Thus, the combination of Pehlke and Hareyama fails to disclose or suggest "wherein the transistors are arranged in a logarithmic scale, thereby enabling a logarithmic change in output power with the powering on or off of a transistor," as recited in claim 15. Applicants respectfully request that the rejection of claim 15 be withdrawn.

Claims 16 and 17 are dependent upon claim 15. Therefore, claims 16 and 17 should be allowed for at least their dependence upon claim 15, and for the specific limitations recited therein.

Claims 6-7 and 13-14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Pehlke and Hareyama, in view of Eidson (U.S. Patent No. 6,255,906). The Office Action took the position that Pehlke and Hareyama disclose all of the

limitations of the claims, with the exception of the thermometer coded power control words. The Office Action then cited Eidson as allegedly curing this deficiency in Pehlke and Hareyama. This rejection is respectfully traversed for the reasons which follow.

Pehlke and Hareyama are discussed above. Eidson discloses a power amplifier operated as an envelope digital to analog converter with digital predistortion. In order to reproduce a particular envelope profile, a selected number of the power amplifiers of the power amplifier array is switched on, whereas another selected number of the power amplifiers of the power amplifier array are switched off. All elements are fed with an RF signal containing phase information as well. The amplified, output signal provided after the power amplifier array is fed to an antenna for signal transmission. Impedance matching circuitry is employed between the power amplifier array and the antenna to provide efficiency for those applications having low power budgets or seeking to operate with extremely high efficiency.

Claims 6-7 and 13-14 are dependent upon claims 1 and 9, respectively. In addition, as discussed above, Pehlke fails to disclose or suggest all of the elements of claims 1 and 9. Furthermore, Eidson fails to cure these deficiencies in Pehlke as Eidson also fails to disclose or suggest, at least, "wherein the instruction specifies at least one of a percentage change in power and a dB change in power." Accordingly, the combination of Pehlke, Hareyama and Eidson fails to disclose or suggest all of the elements of claims 6-7 and 13-14. Additionally, claims 6-7 and 13-14 should be allowed for at least their dependence upon claims 1 and 9, and for the specific limitations recited therein.

Applicants respectfully submit that Pehlke, Hareyama and Eidson, whether considered alone or in combination, fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1, 2, 5-9, and 12-17 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

Majid S. AlBassam
Registration No. 54,749

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802
MSA:jf